REQUEST FOR RECONSIDERATION

The rejection of claims 8-13 under 35 U.S.C. § 103(a) as being obvious over JP 2000-199025A in view of Matsuo (U.S. Patent No. 5,348,702) is obviated by Applicants' perfection of the priority of the present application.

In particular, Applicants have submitted herewith an English translation of the priority application JP 2000-046540, filed on February 23, 2000, which antedates the publication date of JP 2000-199025A, published on July 18, 2000. The English translation includes a statement by the translator that the translation is true and accurate. Therefore, the JP 2000-199025A is no longer be available as prior art.

Accordingly, withdrawal of the rejection is requested.

The rejection of claims 8-18 under 35 U.S.C. § 103(a) as being obvious over Masahashi et al. (U.S. Patent No. 5,348,702) is respectfully traversed for reasons of record and the additional reasons discussed below.

In particular, the Masahashi et al. reference does not any provide evidentiary support for the combined process steps and conditions of the claimed invention. Moreover, in view of the above-amendments, the reference does not describe or suggest a "TiAl based alloy having a *fine* lamellar microstructure. " (See, e.g., the present specification at page 4, line 15 through page 5, line 2, and amended claims 8 and 14). (Emphasis added).

Regarding Masahashi et al., it is noted that the reference generally relates to isothermal forging in vacuum or in argon, which employs superplasticity . In the disclosed method, the atmosphere and temperature are controlled during the process; therefore, the method is not suitable for mass production in terms of efficiency and cost of the production. Furthermore, the disclosed method does not result in the formation of a fine lamellar structure; therefore, the alloy produced with the method will have a lower strength.

Moreover, although the β phase is introduced into the structure, it is a mixed structure with the γ phase having a lower workability.

In contrast, the present invention relates to hot forging in air, and utilizes a hydraulic press or a hammer press. The present invention also relates to high-speed plastic working while cooling; therefore, the method of the present invention is superior to the isothermal forging of the cited reference in terms of the efficiency and cost of production. In particular, the alloy of the present invention has a mixed structure of β and α phases, thereby making it possible to employ hot forging.

For the Examiner's convenience and consideration, Applicants have outlined some general differences between hot forging and hot isostatic pressing, as generally known and understood in the art and which show that the techniques are completely different.

Hot Forging

Method

In a processing method carried out equal to or above the recrystallization temperature of the material, through the application of pressure by beating with a hammer or by a die, the spaces in the metal are crushed; the crystal structure is made finer, and the direction of the crystals is aligned, which increase strength. Also, a target shape is formed by plastic deformation.

Characteristics

- Mechanical strengths such as tensile strength can be improved by making the metal structure finer.
- A target shape can be assigned to the metallic material.
- Processing is carried out in the atmosphere and a room temperature die or a die that does not maintain isothermicity is used. Therefore, the temperature of the material during processing decreases.

Hot Isostatic Pressing

Method

A pressure-treating technique using an inactive gas such as argon as the pressure medium and the synergy of a pressure equal to or above 1000 MPa and a temperature equal to or above 1000 °C. Using a high isotropic pressure (a pressure added equally in all directions) and a high temperature, pressure sintering of a powder, removal of defects in the cast/sintered article, diffusion bonding, and the like are carried out.

Characteristics

- Plastic deformation is not involved. Therefore, when a metallic material is used, defects can be removed but the structure of the metal becomes coarser and the mechanical characteristics are reduced.
- Compressive stress is applied in all directions. Therefore, hot isostatic pressing cannot be used as a shaping process to assign a target shape.
- The isothermal condition of the metal is maintained during processing.

In view of the above-described methods and characteristics of hot forging and hot isostatic pressing, it is very apparent that their manufacturing techniques are completely different. Among other things, a target shape cannot be formed by hot isostatic pressing. Moreover, the metal structure cannot be made finer by hot isostatic pressing. As such, one would certainly not rely on hot isostatic pressing or a combination of these techniques as a basis for attempting to achieve the claimed invention.

Further, Applicants direct the Examiner's attention to pages 23-28 of the present specification, which clearly describes the purpose and criticality of the conditions of the claimed process steps.

In the first embodiment, beginning at page 23, it is noted, *inter alia*, that

> in the . . . high-speed plastic working, the plastic deformation ratio is made as high as 100% or more per second, to thereby

> give distortion which becomes the starting point for the lamellar structure. Since the material undergoes deformation under a high rate of strain, it is necessary to keep the material at as high a temperature as possible at the time of high-speed plastic working to thereby increase the deformation capacity.
>
> Moreover, if the cooling speed from the α phase is too fast, massive transformation occurs, and the lamellar phase is not formed. If the cooling speed is too slow, the lamellar spacing expands to decrease the strength, which is not desirable.

In the second embodiment, beginning at page 26, it is noted, *inter alia*, that

> the TiAl based alloy [is held] in the equilibrium temperature range of the $(\alpha + \beta)$ phase in the phase diagram of FIG. 4 . . . , and using the β phase which is soft and easily workable to effect high-speed plastic working. Since the β phase remains in a relatively large amount even after the plastic working, the high temperature strength, and in particular, the creep strength decrease.

The Masahashi et al. reference, in contrast, does not indicate the advantages of the above-claimed conditions nor suggest any criticality for such conditions, as described in the specification. Therefore, in light of the above-additional reasons, the claimed invention is novel and unobvious over the cited reference.

Accordingly, withdrawal of the rejection is requested.

Applicants submit that the application is now in condition for allowance. Early notification of such allowance is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

Respectfully submitted,

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